## REMARKS

**Claims 9 and 20 are objected to because of the following informalities: claim 9 and 20 recite "global matching compensation" but it is believed that applicant intended to receipt "global motion compensation." Corrective action is required.**

5      Applicant has amended claims 9 and 20 to change the word "matching" to "motion" as suggested by the Examiner. No new matter is entered.

**Claims 1-3, 12-15, 23-26 and 29 are rejected under 35 USC 102e as being anticipated by Nakaya (US 7006571 B1, hereafter referred to as "'6571").**

10      Concerning independent claim 1, applicant asserts that claim 1 should not be found anticipated by Nakaya because Nakaya does not teach all the features of the present invention as claimed in claim 1.

Firstly, applicant asserts that Nakaya does not teach the following feature, as claimed in claim 1 of the present invention:

15      "an interpolation unit <u>for performing interpolation operations on each macroblock</u> contained <u>in each frame</u> of the incoming video stream;" (claim 1 – emphasis added)

The Examiner stated in the Office action of 03/20/2007, "column 13, lines 56-61; the images are synthesized relative to the previously decoded images" is equivalent to the above

20      mentioned feature; however, the applicant respectfully disagrees. In fact, Nakaya teaches both a block matching predicted image synthesizer (for example unit 911 in Fig.11) and a GMC predicted image synthesizer (for example unit 1101 in Fig.11). Applicant notes that each of the image synthesizers 911, 1101 are utilized according to which type of compression is utilized (either block matching or global motion compensation). Furthermore, Nakaya does

25      not teach that these units 911, 1101 perform interpolation on all the macroblocks of the video stream (i.e., on each macroblock of each frame).

Secondly, applicant asserts that Nakaya does not teach the following feature, as is claimed in claim 1 of the present invention:

> wherein when processing a current macroblock, if the current macroblock is encoded using global motion compensation, the interpolation unit performs the
>
> 5        interpolation operations according to a global motion vector <u>on a per-macroblock</u>
>
> <u>basis</u>. (claim 1 – emphasis added)

The Examiner stated in the same Office action that Nakaya teaches such operation in col 15, lines 2-8; however the applicant respectfully disagrees. In fact, applicant asserts that the

10      reason Nakaya cannot have a single interpolation unit (see above remarks of first difference between Nakaya and claim 1 of the present invention) is that Nakaya teaches performing global motion compensation according to motion vectors calculated individually for each pixel. For example, while describing the operation of the global motion compensation predicted image synthesizer, Nakaya teaches in column 15, lines 20-23 that "by using

15      information 1208 relating to the motion vectors of these provisional representative points, motion vectors for each pixel are calculated from equation (12) in a computing unit 1209." Such operation is illustration in Fig.12 of Nakaya; for example, refer to box 1209 labeled, "calculate a motion vector of each pixel", which is coupled to box 1211 to "synthesize predicted image using motion vectors" and thereby output 1203 being "global motion

20      compensated predicted image". Applicant points out that synthesizing a predicted image using different motion vectors for each pixel is not equivalent to the present invention of performing the interpolation operations according to a global motion vector on a per-macroblock basis. That is, the per-pixel basis using different motion vectors taught by Nakaya is not equal to the per-macroblock basis using a single global motion vector for the

25      whole macroblock, as is disclosed by the present invention when doing global motion compensation.

       Applicant further points out that the paragraph [0033] of the present invention explains the benefit of performing the interpolation operations according to a global motion vector on

a per-macroblock basis. Namely, "This means that instead of doing global motion compensation on a per-pixel basis, as is done in the prior art, the present invention can also perform global motion compensation on a per-macroblock basis using a single motion vector for each macroblock. In this way, almost the same hardware as is used in the prior art BM

5     image synthesizer 212 can be used to perform both block-matching motion compensation and global motion compensation in the present invention." (paragraph [0033])

In summary, applicant asserts that claim 1 of the present invention should be found allowable over the cited reference of Nakaya for at least the reason that Nakaya does not teach performing the interpolation operations according to a global motion vector on a

10   per-macroblock basis and therefore also does not teach an interpolation unit for performing interpolation operations on each macroblock contained in each frame of the incoming video stream. Reconsideration of claim 1 is respectfully requested. Claims 2-12 are dependent upon claim 1 and therefore should be found allowable for at least the same reasons.

15   Concerning independent claim 13, applicant points out that similar arguments to those provided above also apply. In particular, applicant asserts that Nakaya does not teach at least the following feature, as is claimed in claim 13 of the present invention:

"<u>performing the interpolation operations according to a global motion vector</u> which is derived from the video bit stream and is in <u>a form substantially identical to that of</u>

20   <u>the macroblock motion vector</u>." (claim 13 – emphasis added)

Similar to the remarks regarding the rejection of claim 1, applicant points out that Nakaya does not teach performing interpolation operations according to a global motion vector. Instead, Nakaya synthesizes a global motion compensation predicted image 1203 by

25   utilizing individual (i.e., not the same) motion vectors for each pixel – see col 15, lines 20-23 (the different motion vectors for each pixel themselves calculated by first calculating motion vectors for representative points – see col 15, lines 13-16). In this way, there is no global motion vector utilized for performing interpolation operations in the design of Nakaya. And

because there is no global motion vector, it follows directly that Nakaya does not teach the global motion vector being in a form substantially identical to that of the macroblock motion vector, as is also claimed in claim 13 of the present invention. For at least these reasons, reconsideration of independent claim 13 is respectfully requested. Claims 14-23 are

5    dependent upon claim 13 and therefore should be found allowable for at least the same reasons.

Concerning independent claim 24, applicant points out that similar arguments to those provided above also apply. In particular, applicant asserts that Nakaya does not teach at least

10    the following feature, as is claimed in claim 24 of the present invention:

a translation unit receiving the global motion parameters, and translating the global motion parameters <u>into a global motion vector which is in a form substantially identical to that of the macroblock motion vector</u>, and

15    The Examiner stated that the translation unit for generating the global motion vector is taught by Nakaya in equations (5), (6), (7), and (8); however, the applicant respectfully disagrees. In fact, Nakaya utilizes equations (5), (6), (7), and (8) to calculate different <u>pixel based</u> motion vectors. For example, see col 5, lines 19-22 stating, "It will moreover be assumed that the global motion compensation used for motion vectors of representative

20    points described in "Background of the Invention" will be performed". Col 1, lines 37-50 state, "In this system, the motion vector (ug(x,y), vg(x,y)) of a pixel (x, y) is expressed in the form: [Formula 1] or [Formula 2] and motion compensation is performed using this motion vector." That is, motion compensation is performed for the pixel (x, y) using the motion vector calculated for the pixel (x, y). In this way, applicant asserts that there is no global

25    motion vector and therefore also no translation unit taught by Nakaya for translating the global motion parameters into a global motion vector. And because there is no global motion vector, it follows directly that Nakaya does not teach the global motion vector being in a form substantially identical to that of the macroblock motion vector, as is also claimed in claim 24

of the present invention. For at least these reasons, reconsideration of independent claim 24 is respectfully requested. Claims 25-31 are dependent upon claim 24 and therefore should be found allowable for at least the same reasons.

5      Further comments regarding the patentability of particular dependent claims is provided in the below sections.

Concerning claim 2, applicant points out that Nakaya does not teach a global motion vector (described above), and therefore also does not teach a translation unit for generating the global motion vector by converting global motion parameters associated with a current

10     frame of the video stream for use by the interpolation unit. Reconsideration of claim 2 is respectfully requested.

Concerning claim 14, as described above, applicant points out that Nakaya does not teach a global motion vector and therefore also does not teach converting global motion parameters associated with a current frame of the incoming video stream into the global

15     motion vector. Reconsideration of claim 14 is respectfully requested.

**Claim 4 is rejected under 35 USC 103a as being unpatentable over Nakaya (US 7006571 B1, hereafter referred to as "'6571").**

As previously described, claim 4 is dependent upon claim 1 which is believed allowable

20     by the applicant for at least the reasons provided above. Therefore, claim 4 should also be found allowable for at least the same reasons.

Additionally, applicant points out that Nakaya does not teach a global motion vector and therefore it would not be obvious to a person skilled in the art to include a global motion vector storage unit. In other words, it would not be obvious to include a storage unit for

25     storing a value that is not taught to exist.

Also, applicant asserts that Nakaya does not teach a multiplexer for selecting whether the interpolation unit uses the macroblock motion vector or the global motion vector. A first reason is that the design of Nakaya does not include a global motion vector, and a second

reason is that Nakaya does not include a single interpolation unit for doing interpolation operations for both block matching and global motion compensation types of motion compensation. (See separate block matching predicted image synthesizer 911 and GMC predicted image synthesizer 1101 in Fig.11) That is, Nakaya does not teach selectively

5 passing either the macroblock motion vector or the global motion vector to a single interpolation unit for performing interpolation operations for all macroblocks of the incoming video frame, as is claimed in claim 4 of the present invention. Reconsideration of claim 4 is respectfully requested.

10 **Claims 5-8, 16-19, and 30-31 are rejected under 35 USC 103a as being unpatentable over Nakaya (US 7006571 B1, hereafter referred to as "'6571") as applied to claim 1-4, 12-15, 23-26 and 29 above, and further in view of Nakaya et al. (US 20010050957 A1, hereafter referred to as "'50957").**

As previously described, claims 5-8, 16-19, and 30-31 are dependent upon claims 1, 13,

15 and 24, respectively, which are believed allowable by the applicant for at least the reasons provided above. Therefore, claims 5-8, 16-19, and 30-31 should also be found allowable for at least the same reasons. Reconsideration of claims 5-8, 16-19, and 30-31 is respectfully requested.

Additionally, concerning claim 26, applicant points out that, as previously described,

20 Nakaya neither teaches an interpolation unit nor a global motion vector. Therefore, Nakaya cannot teach that the interpolation receives the global motion vector when a current macroblock is encoded using global motion compensation. Reconsideration of claim 26 is respectfully requested.

25 **Claims 9, 20, and 27-28 are rejected under 35 USC 103a as being unpatentable over Nakaya (US 7006571 B1, hereafter referred to as "'6571") and Nakaya et al. (US 20010050957 A1, hereafter referred to as "'50957") as applied to claims 1-8, 12-19, 23-26 and 29-31 above, and further in view of Srinivasan (US 20030202607 A1).**

As previously described, claims 9, 20, and 27-28 are dependent upon claims 1, 13, and 24, respectively, which are believed allowable by the applicant for at least the reasons provided above. Therefore, claims 9, 20, and 27-28 should also be found allowable for at least the same reasons. Reconsideration of claims 9, 20, and 27-28 is respectfully requested.

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**Claims 10-11 and 21-22 are rejected under 35 USC 103a as being unpatentable over Nakaya (US 7006571 B1, hereafter referred to as "'6571") as applied to claim 1-4, 12-15, 23-26 and 29 above, and further in view of Hagiwara (US 20040223550 A1).**

As previously described, claims 10-11 and 21-22 are dependent upon claims 1, 13, and 24, respectively, which are believed allowable by the applicant for at least the reasons provided above. Therefore, claims 10-11 and 21-22 should also be found allowable for at least the same reasons. Reconsideration of claims 10-11 and 21-22 is respectfully requested.

Additionally, applicant has amended claim 11 to change the indefinite phrase "is capable of" to "for" and has added the word "only" in front of "incoming MPEG-4 stream having a no_of_sprite_warping_point parameter set to either 0 or 1." No new matter is added. In this way, applicant asserts that claim 11 should be found allowable because as described in paragraph [0033], the present invention takes advantage of MPEG-4 video streams having the no_of_sprite_warping_point parameter set to either 0 or 1 in order to reduce the hardware requirements of MPEG-4 decoders with respect to the prior art. Similar amendments and remarks also apply to claim 22. The cited references of Nakaya and Hagiwara do not teach this limitation and therefore do not enjoy the benefits as described by the present invention. For at least these reasons, applicant asserts that currently amended claims 11 and 22 when combined with the other claimed limitations of their respective base claims should be found allowable with respect to the cited references. Consideration of currently amended claims 11 and 22 is respectively requested.
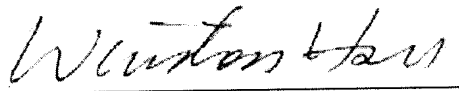
**New Claims**

New dependent claims 32-34 are added. No new matter is entered. For example, claims

32-33 contains features very similar to those claimed in original claim 1, and claim 34

contains features very similar to those claimed in original claims 11 and 22. Applicant asserts

that new claims 32-34 should be found allowable for similar reasons as described in the

above remarks for original claims 34, 11, and 22. Consideration of new claims 32-34 is

5       respectively requested.


Sincerely yours,


_Winston Hsu_          ⁎   Date: _____06.20.2007_____

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is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.)